

### **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

#### **Listing of Claims:**

1. (Currently Amended) A method for multi-objective portfolio optimization for use in investment decisions based on competing objectives and a plurality of constraints constituting a portfolio problem, the method comprising:

generating an initial population of solutions of portfolio allocations in a computing device, ~~the generating the initial population of solutions of portfolio allocations including systematically generating the initial population of solutions to~~ substantially cover the a portfolio configuration space having a plurality of dimensions defined by the competing objectives and the plurality of constraints; ~~and~~

~~—— generating an efficient frontier in a space in the computing device based on the initial population, the efficient frontier for use in investment decisions; and wherein [[the]] generating [[an]] efficient frontier in the space based on the initial population includes:~~

performing a first multi-objective process[[,]] based on the initial population and the competing objectives[[,]] to generate a first interim efficient frontier in a portfolio performance space having at least three dimensions;

performing a second multi-objective process[[,]] based on the initial population and the competing objectives[[,]] to generate a second interim efficient frontier in the portfolio performance space; and

~~augmenting-fusing~~ the first interim efficient frontier with the second interim efficient frontier to create ~~an augmented~~ a fused efficient frontier for use in investment decisions.

2. (Original) The method of claim 1, wherein the generating the initial population of solutions uses a combination of linear programming and sequential linear programming algorithms.

3. (Currently Amended) The method of claim 1, wherein the competing objectives include risk and return ~~and the space is a risk/return objectives space.~~

4. (Canceled)

5. (Original) The method of claim 1, wherein the initial population of solutions includes multiple initial feasible points.

6. (Original) The method of claim 5, wherein the multiple initial feasible points are generated by solving linear programs.

7. (Original) The method of claim 6, wherein the linear programs utilize randomized parameters.

8. (Original) The method of claim 1, wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of risk and returns values.

9. (Original) The method of claim 8, wherein the generating portfolios with different combinations of risk and returns values are performed by adding additional risk and return constraints to a linear program corresponding to the risk and return objectives.

10. (Original) The method of claim 9, wherein portfolios with substantially all feasible combinations of risk and return values are generated by modifying parameters of the added risk and return constraints.

11. (Original) The method of claim 1, wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of competing values.

12. (Original) The method of claim 11, wherein the generating portfolios with different combinations of competing values are performed by adding additional competing value constraints to a linear program corresponding to the objectives of the competing values.

13. (Original) The method of claim 12, wherein portfolios with substantially all feasible combinations of the competing values are generated by modifying parameters of the added competing value constraints.

14. (Canceled)

15. (Currently Amended) The method of claim 1, wherein a dominance filter process is applied on the ~~augmented~~-fused efficient frontier to create a global efficient frontier.

16. (Original) The method of claim 10, wherein nonlinear risk and return constraints are approximated with linear constraints generated by a sequential linear programming.

17. (Currently Amended) A system for multi-objective portfolio optimization for use in investment decisions based on competing objectives and a plurality of constraints constituting a portfolio problem, the system comprising:

a population generation portion that generates an initial population of solutions of portfolio allocations, the population generation portion systematically generating the initial population of solutions to substantially cover a portfolio configuration space having a plurality of dimensions defined by the competing objectives, the population generation portion including[[:]] a range value generation portion for varying values of the competing objectives over a range of each competing objective[[:]], and a linear program portion, ~~the linear program portion: for solving a linear program, for each of the linear constraints, multiple times by setting a weight vector equal to one of the linear constraints[[:]] and solving the linear program multiple times by setting the weight vector equal to a randomly generated vector;~~

~~the range value generation portion and the linear program portion:~~

an efficient frontier generation portion including a first processing portion for performing a first multi-objective process[[:]] based on the initial population and the competing objectives[[:]] to generate a first interim efficient frontier in the portfolio performance space having at least three dimensions[[:]], and a second processing portion for performing a second multi-objective process[[:]] based on the initial population and the competing objectives[[:]] to generate a second interim efficient frontier in the portfolio performance space; and

a fusion portion for augmenting-fusing the first interim efficient frontier with the second interim efficient frontier to create ~~an augmented~~ a fused efficient frontier, ~~the augmented efficient frontier being used~~ for use in investment decisions.

18. (Currently Amended) The system of claim 17, wherein the competing objectives include risk and return ~~and the space is a risk/return objectives space.~~

19. (Original) The system of claim 17, wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of competing objectives.

20-21. (Canceled)

22. (New) A computer readable medium for multi-objective portfolio optimization for use in investment decisions based on competing objectives and a plurality of constraints constituting a portfolio problem, the computer readable medium comprising:

a population generation portion for generating an initial population of solutions of portfolio allocations in a computing device to substantially cover a portfolio configuration space having a plurality of dimensions defined by the competing objectives and the plurality of constraints;

an efficient frontier portion for performing a first multi-objective process based on the initial population and the competing objectives to generate a first interim efficient frontier in a portfolio performance space having at least three dimensions, and for performing a second multi-objective process based on the initial population and the competing objectives to generate a second interim efficient frontier in the portfolio performance space; and

a fusion portion for fusing the first interim efficient frontier with the second interim efficient frontier to create a fused efficient frontier for use in investment decisions.